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THE PORTOLA STUDY—TRACING TYPHOID CARRIERS BY MEANS OF SEWAGE*

ARNOLD E. GREENBERG, S.M., Chief, Sanitation Laboratory

ROBERT W. WICKENDEN, Senior Sanitary Engineer, Bureau of Sanitary Engineering

THEODORE W. LEE, B.A., Associate Sanitary Microbiologist, Sanitation Laboratory, California State Department of Public Health

The classical method of detecting and tracing typhoid carriers is by investigation of probable typhoid cases, followed by analysis of individual fecal or rectal swab specimens. These procedures are complicated, time-consuming, and, more important, they require extensive contact with large numbers of people. A simplified, impersonal screening procedure for narrowing down the suspected area in which the carrier will probably be found would, therefore, be desirable. Moore,[†] in 1948, developed such a procedure, which was based on the analysis of flowing sewage at various points in a sewerage system. Although Moore's method has often been used successfully in locating carriers of enteric diseases in English communities, its use in this country has been limited.

Site Selection

In the United States there are many communities in which cases of typhoid fever occur sporadically. Portola, California, a town of about 2,200 people in the Sierra Nevada Mountains, is such a community. Over the past 20 years more than a dozen isolated cases of typhoid have been reported, the most recent one having occurred in the summer of 1955. Preliminary discussions with the city and county public health officials indicated an interest and enthusiasm for a detailed study of the carrier problem. Local assistance was generously pro-

The successful completion of a study such as the one conducted in Portola depends to a large extent on the co-operative efforts of many people. Department personnel, in addition to the authors, who were engaged in various phases of the study were Miss Lois Ann Shearer, Public Health Nurse; Dr. A. C. Hollister and Dr. Robert Gordon, Bureau of Acute Communicable Diseases; Dr. A. S. Browne and staff, Bacteriology Laboratory; and H. B. Foster, Jr., Gilbert Fraga, and Frank Phillips, Bureau of Sanitary Engineering.

The encouragement and help provided by Dr. W. B. McKnight, Health Officer of Plumas County; Dr. W. S. Bross; the Honorable Ira Baldwin, Mayor of Portola; and Mr. Wesley Johns, Superintendent of Public Works, are sincerely appreciated.

This report is primarily from the viewpoint of sanitary engineering. Articles emphasizing the epidemiological and bacteriological aspects of the study will be published elsewhere.

vided throughout the planning and execution of the investigation.

Portola is situated near the head of a narrow mountain valley on the Middle Fork of the Feather River. The older portion of the town lies on the south bank, the more recently developed section on the north side of

the river. Topographically, both sides are hilly with well-defined drainage toward the river.

In the older part of town public sewers were first provided about 1900. In 1949 a new system, including sewers, an underwater river crossing, a pumping station, and a primary treatment plant was installed. At the same time, sewers were extended to serve the entire community, and connections between the old and new systems were made.

An engineering analysis of the sewerage system was the first step in selection of sampling points. After inspection of the available maps, a field party examined the system in order to verify the location of sewers and the accessibility of manholes which were to be used as sampling points. Buried manhole covers were located with the aid of a mine detector and were dug up. Dye studies to determine the direction of flow in certain sewers were necessary because of the lack of adequate information on the connections between the old and new systems. As a result of all of this preliminary work, a final corrected map was prepared. This is shown in Figure 1.

Sampling Procedure

According to Moore,¹ the procedure of choice is to begin sampling at the most distant point in the system and to work back, ultimately reaching individual household connections. Since we were interested in completing the study quickly, it was decided to sample daily from as many points as

* Presented at the Annual Meeting of the California Sewage and Industrial Wastes Association in San Diego, May 3, 1957.

† See references at end of article.

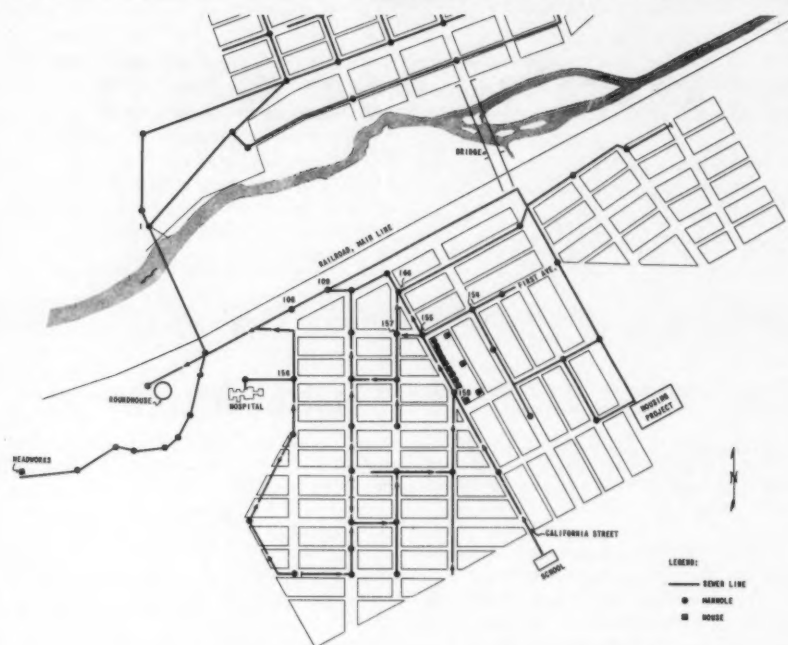


Figure 1. Sketch map of sewage system, Portola, California.

possible. Because of the division of the town into two roughly equal portions connected by a single sewer which crosses from the north to the south side of the river, samples were collected from each side on alternate days. In addition, samples from the treatment plant and Manholes 1 and 108 were sampled daily.

The swabs were prepared in the following manner: A piece of surgical gauze was folded into a pad of eight thicknesses which was 6" by 6" square. To each swab was attached a length of string. The swab and string were packaged in paper bags, sterilized, and thus made ready for use. To insert a swab into a sewer, a stick or nail was driven into a crevice in the manhole, the swab was aseptically removed from its wrapping, the free end of the string was attached to the stick so that the swab was half immersed in the flowing sewage, and the manhole cover was replaced. After 24 or 48 hours or longer, the swabs were carefully withdrawn, placed in sterile widemouth bottles, and returned to the laboratory for analysis.

In addition to swab samples, scrapings from grease deposits were removed for analysis. Scouring, due to

the high velocities in many sewers, prevented the accumulation of appreciable quantities of grease. In these instances the sewer walls were wiped with a sterile swab which was analyzed in the same fashion as the regular swab samples.

Laboratory Procedure

Since it was unknown how long pathogenic enteric bacteria might survive on a swab, provisions were made to have all samples analyzed within two hours after collection. This was accomplished by using a mobile laboratory equipped to isolate and provisionally identify typhoid bacteria. Complete biochemical and serological identification was made in the Bacteriology Laboratory of the California State Department of Public Health. After some weeks of sampling, duplicate swabs were taken: One was analyzed immediately, while the second was analyzed after 24 hours' storage in an ice chest.

The isolation procedure of choice was to cover the swab with Selenite F enrichment broth and, after appropriate incubation, to streak on bismuth sulfite agar. Typical typhoid colonies were picked and inoculated into triple sugar iron agar. Cultures producing a typical reaction were

tested on urea agar and those showing no urease activity were sent to the Bacteriology Laboratory for further testing.

Typhoid Organism Found

Salmonella typhi was isolated from the first swab sample taken from the sewage treatment plant. While this did not help in locating the source of the infection, it did encourage us in that we had evidence of the presence of a carrier on the system and that our technique was capable of recovering the organisms from sewage. Five days later a grease sample from Manhole 157 was positive, and two days thereafter Manholes 108, 109, and 166 yielded positive swabs. Since 166 and 157 are adjoining manholes, and since Manholes 108 and 109 are on the main trunk draining that area, the section tributary to the sewer at Manhole 166 was suspected.

In two weeks of sampling on the north side of the river positive findings were never obtained; therefore, sampling was discontinued there except at Manhole 1. This made possible more intensive sampling of the suspected area. During a second two-week period the organisms were traced back as far as Manhole 155, but not to 154 or 159. By carefully placing swabs so as to separate the two flows entering Manhole 155 it was found that the typhoid organisms entered the sewer between Manholes 155 and 159. This finding permitted us to focus attention on the 25 houses which were connected to the sewer between these manholes.

Carrier Located

Following the example set by Kwantes and Speedy,² household investigations were made by placing swabs in the toilets of the houses involved. Before we attempted to enter the houses the householders received a letter from the local health officer indicating what was being done and why. In general, this approach led to good co-operation. Forty-eight hours after the swabs were placed in the toilets they were removed and analyzed. The toilet in only one house, that occupied by an elderly man living alone, was positive for *S. typhi*. Analysis of stool specimens provided by this individual confirmed that he was the carrier. Indeed, his feces were almost a pure culture of *S. typhi*.

Phage typing of the typhoid bacteria isolated from all sampling points showed that the organisms were identical, i.e., all were atypical members of phage group D. Subsequent studies demonstrated these to be a phage type described by Scholtens³ as Utrecht IX.

Requests are often received in health department laboratories to assist in the location of typhoid carriers or, more frequently, to simply demonstrate the presence of enteric pathogens in sewage. Although such organisms have been isolated on numerous occasions,⁴ this has usually been accomplished in a haphazard fashion due to the use of "grab" samples. Furthermore, since carriers of enteric diseases do not usually discharge the organisms in their feces regularly, but rather on an unpredictable intermittent basis, recovery of the organisms from sewage may be impossible unless a relatively large number of cases or carriers is present in a community.

Method Permits Monitoring

Moore's method¹ will monitor a sewer during the entire period that the swab is exposed. Theoretically, all organisms present in the sewage which contacts the swab will be concentrated on it, principally by mechanical means. This concentration may be compared to the effect of the "Schmutzdecke" on a slow sand filter where the accumulation of slimes, greases, etc. tends to efficiently remove micro-organisms and other particulate matter. Thus, instead of a "grab" sample which bears no relationship to the flow or to the excretory habits of the carrier, the swab provides an approximation of a composite sample. This also means that smaller and fewer samples would have to be examined.

In the event that one is called upon to investigate a specific problem there can obviously be little choice in the selection of the site. However, detailed and accurate information on the location and accessibility of manholes and on the directions of flow in sewers is essential. Unless the site is carefully studied from an engineering point of view the laboratory results, even though they show the presence of enteric pathogens, may be of little value in tracing the carrier.

How Long Do You Sample?

The sampling procedure itself is relatively simple and straightforward. The major question relates not to how or where to sample, but rather to how long to leave the swab immersed in the sewage. Various investigators have left the swabs in place for from one to seven days. None have been able to show clearly any technical advantage to any exposure time. Convenience alone may dictate what this should be. Too long an exposure time will lead, however, to excessively dirty swabs and, in small sewers, there may be a sufficient accumulation of material around the swab to effectively block the sewer. This obviously should be avoided. Another hazard mentioned by Kwantes and Speedy² was the loss of swabs due to the activity of rats which gnawed through the supporting string. To overcome this they used picture wire instead of string. In our work not a single swab was lost from this or any other cause. When manholes are entered to collect samples, care must be taken to prevent contamination of the swab. This is especially important when an attempt is being made to separate the flow of several sewers entering a common manhole. Grease samples may be collected in any convenient manner provided that aseptic technique is observed.

A total of 817 samples was analyzed. Of these, 18 were positive for *S. typhi*. Two hundred eighty-seven swabs were analyzed in duplicate. Of those analyzed immediately four were positive, while of those analyzed after 24 hours five were positive. Although the number of positive swabs obtained either way is too small to permit significant conclusions to be reached relative to the need for immediate examination, the indications are that a delay of 24 hours before analysis will not appreciably affect the end results.

Type of Sample

Another question which cannot be answered with assurance is the relative value of swab vs. grease vs. "wipe" samples. Previous experience which we have had with grease deposits in sewers and on beaches showed that large numbers of various *Salmonella* species survived for several months in such deposits. If this observation can be confirmed it may

suggest an even more desirable sampling procedure than by means of swab analysis, since the grease may accumulate over a long period of time and hence reflect past as well as current presence of enteric pathogens. The same obviously holds true for sewer wipe samples. It is hoped that further work along these lines will provide more definite answers.

Phage Typing Aids Epidemiology

Phage typing serves to differentiate strains of a single species, and therefore is an essential part of the analysis of the typhoid organisms isolated in this way. This has been pointed out by Moore¹ and others^{5,6,7}. In this study phage typing proved invaluable in providing confirming epidemiological information. The phage type Utrecht IX had previously never been observed in this Country.⁸ This immediately led us to look for an individual who came from Holland where the type was first found or for someone who had had significant contact with Dutch people. The carrier who was identified by the toilet swab procedure had been raised in Europe. About 50 years ago he lived in a house in which occurred at least one case of typhoid fever among Dutch nationals. Unknown to him he had become a carrier and had presumably been shedding the organism all these years. In still another way did the phage typing assist in the final location of the carrier. During a brief period, a number of positive swabs were recovered from Manhole 156 into which drained the hospital sewer. No other sampling points yielded positive results during that time. As before the phage type was Utrecht IX. Because of the uniqueness of this phage type a single source was suspected. These facts, baffling at first, caused us to investigate the connection between the patients and staff of the hospital and the residents of the 25 suspected homes. We found that the carrier had been hospitalized during this period for reasons unrelated to typhoid fever. We were thus able to explain the results.

It is clear that the sewage swab technique, or a combination of it with the household survey of study conducted along classical epidemiological lines, led to the same individual. To have used only the epidemiological survey would have increased the

amount of medical and nursing work enormously. It would have been necessary to examine some 2,200 people instead of one who had been singled out by the sewage swab test results.

Technique Adaptable to Other Organisms

The technique of sewage sampling described here can readily be adapted to the study of other sewage-borne organisms. As early as 1916 Brown, Heise, and Petroff⁹ used a similar procedure for the recovery of tubercle bacilli in the effluent and receiving stream of the Trudeau Sanatorium in New York. More recently, Kelly and her coworkers¹⁰ used it for recovering Cocksackie virus, tubercle bacilli, and enteric pathogens from sewage. It can likewise be used in attempting to demonstrate sewage contamination of streams or lakes. If isolations of any enteric pathogens are made, the results are more immediately useful than coliform counts since real, not potential, hazards are demonstrated.

The methods and the results of the present study also have significance for sewage treatment plant operators in that it may now be possible to better evaluate the hazard to them in handling sewage. Gainey and Lord¹¹ in 1952 estimated that there are 40-50 typhoid carriers per 100,000 population. Undoubtedly the carrier rate has decreased as the incidence of the frank disease has decreased. Nonetheless, there may be sufficient carriers to produce a hazard to those coming into direct contact with sewage. Kehr and Butterfield,¹² for example, estimated that the ingestion of a single typhoid bacterium is sufficient to cause disease in 1 percent of persons exposed. Therefore typhoid and, presumably, other enteric infections should be recognized as a definite occupational hazard for operators. Swab or wipe samples taken at the plant may be used to assess this hazard.

Summary

An application of the sewage swab procedure as developed by Moore has been described. In this procedure gauze swabs are suspended in sewage, suitably exposed and cultured for enteric or other pathogenic organisms. Following the organisms through a sewerage system to household connections and into house toilets is possible. By means of this technique a typhoid carrier was identified in a town of 2,200 people.

Comparative Data for Cases of Selected Notifiable Disease California, Month of May, 1957

Diseases	Cases reported this month			Cumulative cases from January 1		
	1957	1956	1955	1957	1956	1955
Anthrax	--	--	--	--	--	--
Botulism	--	--	1	--	--	1
Brucellosis	4	--	3	14	13	22
Coccidioidomycosis ¹	20	11	5	91	67	32
Diarrhea of newborn	3	1	--	12	3	4
Diphtheria	--	3	2	4	15	12
Encephalitis, acute ²	69	75	44	204	230	144
Gonococcal infections	1,689	1,413	1,083	6,896	6,130	5,942
Hepatitis, infectious	196	173	114	839	872	826
Hepatitis, serum	7	10	4	43	42	24
Leprosy	1	1	1	9	3	8
Leptospirosis	--	--	1	--	2	1
Malaria	3	4	1	9	10	7
Measles	10,068	7,831	15,371	44,667	21,883	50,134
Meningococcal infections	11	19	20	89	137	134
Mumps	3,318	5,235	4,391	12,565	24,381	19,569
Pertussis						
(whooping cough)	225	298	515	661	959	2,761
Polio myelitis—total	58	104	139	192	523	391
Psittacosis	4	2	1	16	14	15
Q fever ³	6	3	NR	16	20	NR
Relapsing fever	--	--	--	--	--	--
Rabies, animal	34	26	13	69	168	95
Rocky Mountain spotted fever	--	--	--	--	1	1
Salmonellosis	74	128	100	392	515	372
Shigellosis	158	115	37	525	696	373
Streptococcal infections (including scarlet fever)	1,133	587	775	5,075	3,127	5,037
Syphilis	3,439 ⁴	670	463	5,580 ⁵	2,670	2,525
Tetanus	5	1	--	11	13	15
Trachoma	79	--	--	80	3	1
Trichinosis	1	1	1	1	5	1
Tuberculosis	712	651	657	2,999	2,899	3,014
Tularemia	--	--	--	1	1	2
Typhoid fever	6	10	3	23	40	38
Typhus fever, endemic	--	--	--	1	2	1

¹ Since July 1, 1955, active primary (including cavitary) and disseminated coccidioidomycosis reportable.

² Encephalitis, acute, includes arthropod-borne infections, postinfectious cases, and those with etiology undetermined.

³ NR—not reportable prior to July 1, 1955.

⁴ Includes 2,832 cases from special serologic survey (Mexican national farm workers).

⁵ Includes 3,046 cases from special serologic survey (Mexican national farm workers).

The application of this procedure to the study of sewage discharges to relatively pure water has been mentioned.

The use of the sewage swab in assessing the health hazards to sewage treatment plant operators has been suggested.

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Dr. Browne on Leave To Guatemala

Dr. Alcor Browne, Chief, Bacteriology Laboratory, California State Department of Public Health, is on leave from the department as a consultant on technical problems to the Institute of Nutrition of Central America, an agency of the Pan American Sanitary Bureau. Dr. Browne's special interest while in Guatemala will be to study enteric diseases following up questions raised by Dorthy Beck of this department, who was on a similar assignment to Guatemala last year. Dr. Browne will return to California August 1, 1957.

Dr. Dyar Appointed to National Committee

Robert Dyar, M.D., Chief, Division of Preventive Medical Services, California State Department of Public Health, has accepted an appointment to serve on the Committee on Epidemiology and Biometry of the National Institutes of Health as a special consultant to the Public Health Service. The 15-man committee reviews applications for research grants and training grants in epidemiology and biometry and makes recommendations to the National Institutes of Health.

Dr. Dyar is the only person from a state or local public health agency selected to serve on the committee. The appointment is for three years.

The mechanism and site of action of a hormone that controls red blood cell formation has been reported.—*Scope-Weekly*, April 3, 1957.

Reduction of Radiation Exposures Recommended

A lowered maximum permissible dose of radiation exposures to man has been recommended by the National Committee on Radiation Protection and Measurement (N.C.R.P.), an advisory group of experts in various phases in the radiation field. These new standards were reported in the February, 1957, issue of the *Technical News Bulletin* of the National Bureau of Standards.

The changes in the accumulated maximum permissible dose are not based on positive evidence of damage due to the use of earlier permissible dose levels, but rather on the desire to bring the maximum permissible dose into accord with trends of scientific opinion. It is recognized that there are many uncertainties in the available data and information. Consideration has also been given to the probability of a large future increase in radiation uses. The committee has reviewed its previous recommendations, particularly with respect to genetic effects and the possible shortening of the average life expectancy due to radiation exposure of a major fraction of the population.

Conditions in all existing radiation installations should be modified to meet the new recommendations as soon as practical and the new maximum dose limits should be used in the design and planning of future apparatus and installations. Because of the impact of these changes and the time required to modify existing equipment and installations to meet the new standards, the committee recommends that a conversion period of not more than five years be adopted within which time all necessary modifications should be completed.

Some of the more important recommendations of the committee are:

(1) *Accumulated Dose.* For occupational exposures the maximum permissible accumulated dose, in rems (roentgen equivalent man), at any age, is equal to five times the number of years beyond 18, provided no annual increment exceeds 15 rems. Thus the accumulated maximum permissible dose equals 5(N-18) rems, where N is the age and is greater than 18. This applies to all critical organs ex-

cept the skin, for which the value is double.

(2) *Weekly Dose.* For occupational exposures the previous permissible weekly whole-body dose of 0.3 rem, and the 13-week dose of 3 rems when the weekly limit is exceeded, are still considered to be the weekly maximum permissible dose, with the above restriction for accumulated dose.

In essence, the rules on "accumulated dose" and "weekly dose" mean that a person may receive, in exceptional cases, a maximum occupational exposure of .9 rems in any seven-day period provided his accumulated dose in any 13 consecutive weeks does not exceed 3 rems. Furthermore, a maximum dose of .3 rems per week is allowed up to 52 consecutive weeks. In any case, however, the long-term occupational dose shall not exceed an average of 5 rems per year which is equivalent to an average dose of .1 rem per week. Thus, the former average dose of .3 rems per week has been reduced to .1 rem per week. Shielding and other protective measures should be designed to limit exposures to the average dose of .1 rem per week for occupational exposures. Nonoccupational exposures shall not exceed .1 of the permissible occupational exposures. Each person shall be assumed to have received his maximum accumulated dose unless his occupational exposure has been documented or is known. For example, he cannot receive more than an average of 5 rems per year of future exposure unless he has documentary evidence (film badge monitoring, etc.) that he has received an accumulation of less than 5 rems per year since his eighteenth birthday.

(3) *Emergency Dose.* An accidental or emergency dose of 25 rems to the whole body, occurring only once in the lifetime of the person, shall be assumed to have no effect on the occupational radiation tolerance status of that person. (See National Bureau of Standards Handbook 59.)

(4) *Medical Dose.* Radiation exposures resulting from necessary medical and dental procedures shall be assumed to have no effect on the occupational radiation tolerance status of the person concerned.

It is considered that with the current and proposed low levels of occupational exposure it is presently not

necessary to make special allowance for medical exposure in conjunction with occupational exposure. This consideration may later become important. The effects of medical exposures have long been considered by this committee to be the responsibility of the attending physician; it is his responsibility to be familiar with and to evaluate medical radiation exposure in relation to the health of the individual. (See National Bureau of Standards Handbook 59.)

(5) *Whole Population.* The maximum permissible dose for the population of the United States as a whole from all sources of radiation, including medical and other man-made sources, and background, shall not exceed 14,000,000 rems per million of population over the period from conception up to age 30, and one-third that amount in each decade thereafter. Averaging should be done for the population group in which cross-breeding may be expected.

(6) *Internal Emitters.* In occupational exposure the permissible radiation levels to the gonads or whole body for internal emitters (radioactive isotopes which may get into the body) will be one-third the values heretofore specified. For other organs the rules are unchanged.

Public Health Positions

Inyo County

Public Health Veterinarian: Starting salary \$505. To do rabies control, dairy inspection, milk grading and veterinarian consultation. Mileage. For further information write Victor H. Hough, M.D., Health Officer, Inyo County, Box 215, Independence.

San Diego County

Executive Assistant: Salary range, \$616 to \$749. Candidates must be college graduates, a master's degree in public health administration is desirable, and three years' experience which includes two years in a government agency and one year in a supervisory capacity. For further information write Department of Civil Service and Personnel, Room 402, Civic Center, San Diego.

Ventura County

Bacteriologist: Salary currently starting at third step of range, \$387, top, \$427. California certificate plus six months' experience required. For application and details write Personnel Department, Courthouse, Ventura.

Galileo Galilei (1564-1642) first thought of counting the pulse.—*Better Health*, Vol. 15, No. 5, November, December, 1956.

Canine Rabies Outbreak In Monterey County

At least 33 persons, 10 in one household, are under antirabic treatment in Monterey County as a result of being in contact with infected animals. Seventeen dogs and two skunks have been recognized as being rabid during the last three months. All but three of the animals were confirmed rabid on laboratory examination. Three dogs were not submitted to the laboratory, but are considered presumptive cases on the basis of clinical diagnosis.

The outbreak has centered in the Castroville area, a small unincorporated community of about 2,000 persons, located on the coast nine miles north of Salinas. Sixteen of the 19 rabid animals have come from this area. A mass community vaccination clinic was held in Castroville on May 28. At least 70 stray dogs have been impounded from the area.

During 1956 there were 10 recognized cases of animal rabies in the county, nine skunks and a cat, none of which occurred in the vicinity of the recent outbreak.

Monterey County has required vaccination as a prerequisite to licensing since November, 1955; however, enforcement of the ordinance is difficult since dogs are not required to be licensed, and hence not vaccinated, if kept in strict confinement on the owner's property. Indications, from available information, are that a very low percentage of the dogs in the county have been vaccinated. The California State Department of Public Health has recommended that this exemption provision in the ordinance be rescinded and that the ordinance require vaccination of all dogs.

There has been a total of 87 cases of animal rabies reported in the State this year: 52 skunks, 30 dogs, 3 bovine, and 2 cats.

U. S. S. R. Resumes Active Participation in WHO

The government of the Union of Soviet Socialist Republics has informed Dr. M. G. Candau, Director General of the World Health Organization, of its decision to resume active membership in WHO. The U. S. S. R. became a member state in March, 1948, but in February, 1949, discontinued active participation in WHO. In January of this year, Al-

SPECIAL CENSUS RELEASES *

Special Census of California cities, **Series P-28** *Alameda County:* Piedmont (1988); *Contra Costa County:* Antioch (1983), El Cerrito (1980), San Pablo (1992); *Imperial County:* El Centro (1982); *Los Angeles County:* Arcadia (1978); *Orange County:* La Habra (1996); *Riverside County:* Corona (1984); *San Bernardino County:* Barstow (1994), Ontario (1993); *San Diego County:* La Mesa (1985); *Ventura County:* San Buenaventura (1987).

Copies of these releases may be obtained from: Library, Bureau of Foreign and Domestic Commerce, United States Department of Commerce at 419 Customs Building, 555 Battery Street, San Francisco, California, or at Room 450, 1031 South Broadway, Los Angeles, California.

* In ordering, specify series and number as shown in parentheses. These numbers are not population figures.

Laboratory Receives Perfect Score

The California State Department of Public Health Laboratory has received a perfect score on mycology identification of 48 unknown specimens submitted to the laboratory by the Mycology Unit of the Communicable Disease Center of the U. S. Public Health Service. Each year the center submits test specimens to 29 state laboratories. This year only California and one other state laboratory were able to correctly identify all 48 specimens.

This department's Mycology Laboratory serves as a reference laboratory for public health and clinical laboratories and dermatologists who desire definitive identification of fungi isolated from pathological situations. Mrs. Nina Chern is in charge of the Mycology Unit. Dr. Alcor Browne is chief of the Bacteriology Laboratory.

bania, Bulgaria, and Poland announced their resumption of active participation in the World Health Organization. The WHO member states which still remain inactive are Czechoslovakia, Ukrainian S. S. R., and Byelorussian S. S. R.

Honored on Retirement From Public Health Faculty



Friends, colleagues and former students have established the Dorothy B. Nyswander Lecture in honor of Professor Nyswander's retirement from the faculty of the School of Public Health, University of California. Mayhew C. Derryberry, Chief, Public Health Education Services, Public Health Service, delivered the first lecture, "Health Education in Transition."

Dr. Nyswander joined the faculty as Professor of Health Education in 1946. Her experience has been broad. For 10 years she was professor of educational psychology at the University of Utah. She established a child guidance clinic at the university, and worked with groups throughout the state in the field of child welfare and parent education. She directed the Astoria School Health Study for the Board of Education and Department of Public Health of New York City for the purpose of improving the health services for the city's million school children. The results of this work were published in a book, "Solving School Health Problems," which has been used widely by health and school personnel all over the Country.

During the war she was health education consultant to the educational programs in Latin America under the auspices of the Inter-American Edu-

Local Health Officers Consider Suicide Prevention Studies

In an effort to lower California's suicide rate, health officers of 11 jurisdictions are considering studies that will attempt to prevent suicide.

The interest in this public health problem was stirred by a recent study in Los Angeles, which showed that 75 percent of their series of "successful" suicides had either attempted suicide unsuccessfully previously and/or had told a minister or physician that they were going to commit suicide.

This raised two questions for the California State Department of Public Health's Mental Health Services: Can we work with the people who give advance notice of their intention in order to make unnecessary a successful attempt, and can we find out what segment or segments of those people who give advance warning we can actually work with?

Eleven local health officers, of whom two already had some experience with such a prevention project, have expressed interest in the study. The clinical action part of such a project would entail how a team of mental health experts from a county hospital or from a local health department can best direct its efforts to working with an attempted suicide patient and his family to change the environment such that another attempt would be unnecessary.

Dr. Thomas Dublin, U. S. Public Health Service, at a recent meeting of the California Conference of Local Health Officers in Los Angeles, said he felt such a program, if adequately planned and staffed, could be subsidized with federal funds.

While its time is limited, the Mental Health Service will assist in the design of a research program in suicide prevention with the staff of this department, the State Department of Mental Hygiene, University of California, local health departments and their community agencies; ministers, police, county hospital, coroner and others.

education Foundation of the State Department. She has served as a consultant to the World Health Organization in Geneva, to the high commissioner's office in Germany and to many Latin American countries.

Dr. Frederick M. Kriete Appointed Deputy Director



Dr. Malcolm H. Merrill, Director, California State Department of Public Health, has selected Frederic M. Kriete, M.D., as his deputy director. The appointment was effective July 1, 1957. The position of deputy director was established in the recent session of the State Legislature.

Dr. Kriete joined the department in 1947 as Chief, Bureau of Maternal and Child Health, and in 1950 was appointed Assistant Chief, Division of Preventive Medical Services.

Prior to coming to California Dr. Kriete was associated with the Utah State Department of Public Health as a consultant in pediatrics and later director, division of maternal and child health.

He is a graduate of DePauw University and received his medical degree from Rush Medical College, University of Chicago, in 1938. He took his internship and pediatric residencies at University of Iowa Hospitals, Iowa City; Presbyterian Hospital, Chicago; and Babies and Childrens Hospital and City Hospital, Cleveland.

Dr. Kriete was born in Tokyo, Japan, in 1913, where his family was in the missionary service for the Evangelical and Reformed Church.

Handbook of Public Health Responsibilities in California Completed

In the course of committee deliberations of the California Conference of Local Health Officers the question often arises as to where responsibility for action rests. Does it rest with the State or is it a local responsibility? Or is there a joint responsibility on the state and local level?

The frequency of these queries brought about a request from the conference, in 1954, that the State Health Department record in detail the areas of responsibilities carried by the various professional fields in official public health agencies. The conference further requested the State Health Department to attempt to differentiate between state and local responsibilities.

A handbook on this subject has just been completed and a limited distribution has been made within the State. A notable feature of this handbook is the democratic manner of its preparation. Each division, bureau and service chief in the State Health Department was requested to outline what he considered to be the responsibilities of his own unit, the responsibilities of local health department in the same field of work, and dual or joint responsibilities in that field.

The material was assembled and sent for review and suggestions to all local health officers in the State. Replies were received from about one-third of the local health officers. Most of these included comments from the heads of their different services.

The comments were forwarded to the various state unit chiefs concerned

and revisions in the text were made when necessary or desirable.

The revised sections were then referred for discussion and action to the appropriate committees of the conference.

The following is excerpted from the introduction to the handbook:

"The 'responsibilities' here assembled stem not only from legislative acts and measures promulgated by the State Board of Health, but also include procedures derived from logical working experience based on the relative scope of jurisdiction, state-wide, local and joint, as well as matters of convenience and administration. These latter responsibilities are expressed with the intent of broad recognition of local autonomy supported where desired or necessary, by state aid and action."

The Handbook of Public Health Responsibilities in California includes responsibilities for 19 professional fields.

Three Related Cases of Psittacosis Reported

Three male employees of a Long Beach hardware store contracted psittacosis after being exposed to a large group of infected parakeets. It was the practice of the store to give a parakeet free with each cage sold. The three employees became ill within an 11-day period, suffering symptoms of chills, coughing, recurrent temperature and loss of weight. Positive diagnosis was made in all three cases on the basis of serology.

At the time of the investigation all of the original group of birds had

been sold with the cages, and since the store did not keep records of individual sales, follow-up investigations were not possible. Birds found on the premises at the time of quarantine were positive for psittacosis on laboratory examination. Inspection of leg bands on the birds revealed that they had been obtained from at least 19 different breeders.

Mental and neurological diseases may account for more days of disability in younger age groups than any other kind of illness.—*Mental Health Progress*, Vol. 8, No. 1.

GOODWIN J. KNIGHT, Governor
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Berkeley

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